

REMARKS

Claims 24-26 are the sole claims remaining in this application. The Examiner has withdrawn the indication of allowance of claims 24-26 in the last action. In view of this, claim 24 has been amended to significantly narrow the scope of the invention set forth in previous claim 24 and to more particularly define the improved technology. Claims 1-23 and 27-31 have been withdrawn, without prejudice, and are intended to be filed in due course in a divisional application. Reconsideration and re-examination are requested in view of the foregoing amendments and the comments made hereinafter.

Rejection of claims 24-26 for obviousness

The Examiner rejects claims 24-26 for obviousness under 35 U.S.C. 103(a) as being unpatentable over United States Patent 5,025,985 (Enander) in view of United States Patent 6,283,067 (Akkala) and further in view of United States Patent 6,152,083 (Bridegum).

For the convenience of the Examiner, the present invention relates to a significant improvement in efficiency in producing hot water from a water heater which utilises a diesel burner. This improvement is caused by the addition of an exhaust stack which runs from the burner through the water jacket. Thus the water in the water jacket is heated by the burner and by the hot combustion gases in the exhaust stack which gases emanate from the combustion within the burner. Thus, the water in the water jacket is heated by two sources. A second significant advantage in using the exhaust stack for heating the water in the water jacket is that the exhaust gas itself is cooled by the water in the water jacket and therefore leaves the exhaust stack at a lower temperature than if it did not run through the water jacket. Heaters according to the present invention are used in boats and recreational vehicles. Higher temperature exhaust gases are dangerous because there are often volatile vapors present such as propane and gasoline vapors. The lower the

exhaust temperature, the less likelihood there is of combusting the vapors. And of course, the less likely the danger of burning to users. The disadvantages and dangers of using propane, for example, are set forth in the specification commencing at page 1, line 15 and extending over to page 2, line 9.

Reference is initially made to Figures 1A and 5B. With reference to Figure 1A and to the specification at page 7, line 11, an exhaust jacket 103 surrounds burner 101. The exhaust jacket 103 conveys hot exhaust from the burner to the exhaust manifold 104 and thence to the exhaust stack 110. The water jacket 110 surrounds the burner 101 and the water in the water jacket 110 is heated not only by the burner 101 but also by the exhaust manifold 104 as is clearly seen in Figure 1A. As described at page 11, lines 1-8, hot gases emanate from the combustion flame 122 and leave the end of the burner tube 101. The exhaust gases travel through the exhaust jacket 103 to the stack 124, thence to the exhaust manifold 104 and final exhaust stack outlet 110.

Enander teaches no such configuration. Enander describes a burner 48 (see Figure 3A) and such a burner has a "coolant jacket (not shown) of such burner 48...[which has] a diameter ...greater than that of the o.d.[outside diameter] of the combustion chamber 49 (Figure 3)." See col. 7, lines 60-64. But it is very clear that Enander does not have an exhaust manifold which runs through his "coolant jacket". As set forth in the Enander disclosure and with reference to Figure 5, Enander teaches a "combustion chamber 49...in the form of a closed...cylinder 50 [with] an air/fuel inlet 51 at one end 52 and an exhaust pipe 53...at the other end 54." See col. 7, lines 55-59. There is no teaching or suggestion that Enander's exhaust pipe passes through his water jacket. Further, while Enander does state that his burner has a coolant jacket, he does not teach or show that the coolant jacket also surrounds the end of his combustion chamber 49 which would be necessary if his exhaust duct passes through a water jacket. In fact, Enander states that his coolant jacket "...[has] a diameter typically one inch

greater in diameter than that of the o.d. of the combustion chamber 49 (or seven inches) and a length of about twelve and one-half inches...". Col. 7, lines 62-65. Thus, it is pretty clear that Enander's water jacket does not extend about the end of the burner 48. In any event, with a coolant jacket having a diameter one inch greater than the o.d. of the combustion chamber 49, there is just no room available for an exhaust duct to travel through the water jacket. It is inescapable that the exhaust pipe 53 of Enander travels directly from the end 54 of the combustion chamber 49 and that such exhaust pipe 53 does not travel through the coolant jacket because it cannot.

The Akkala reference teaches a gas burner which exhausts its combustion products through a "flue 82 extending through the potable in the tank 14". The flue 82 is centrally located within the tank 14. As such, it would not be possible to combine Akkala's flue with the Enander water tank since it would not be possible for the centrally located flue 82 of Akkala to be positioned in the Enander heater. It will be similarly noted that the exhaust stack of the present invention cannot be positioned "centrally" within the water tank due to the presence of the central heater.

The addition of the Bridegum tank will not assist the deficiencies of the Akkala and Enander references. Indeed, there is no disclosure of a tank with concave end portions in Bridegum and certainly no disclosure of his tank configuration being such that it "...would take cyclic pressure stresses of the heater while heating the potable water from inside..." as the Examiner states. Indeed, Bridegum's gas burner is outside the tank as most gas burners are similarly located. Bridegum's emphasis is on a "unique combustion chamber, Figs. 5 and 5A" (col. 4, line 44). His tank is illustrated in Figure 1 and that tank does not show concave end pieces. Figure 7A seems to illustrate a semi-concave end piece to the rightwards of the figure which could perhaps be the end piece of the water tank but this is not clear at all. Similarly, the opposite end piece is of a configuration for accepting the finished assembly of Figures 5 and 5A "by

inserting the two tubes into the appropriate openings in the head..." (Col. 4, line 66 to col. 5, line 1). In any event, it is clear that Bridgum cannot be combined with either Enander or Akkala. Bridgum discloses the U-shaped "unique combustion chamber". This combustion chamber which is utilised for gas burners and not for diesel burners would interfere and not allow the placement of a diesel burner located in the central area of the water tank. Accordingly, it would be impossible to combine the three references cited by the Examiner.

In view of the above, it is submitted that this application is now in condition for allowance. Re-consideration and withdrawal of the objections and rejections is requested and allowance of claims 24-26 is solicited.

The Examiner's attention is also directed to the new address of record and telephone and facsimile numbers for the undersigned.

Respectfully submitted,

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